

**Before the  
Federal Communications Commission  
Washington, D.C. 20554**

In the Matter of	)	
	)	
Promoting Expanded Opportunities for Radio	)	ET Docket No. 10-236
Experimentation and Market Trials under Part	)	
5 of the Commission’s Rules and Streamlining	)	
Other Related Rules	)	
	)	
2006 Biennial Review of Telecommunications	)	
Regulations – Part 2 Administered by the	)	
Office Of Engineering and Technology (OET)	)	ET Docket No. 06-105
	)	
	)	

**COMMENTS OF MARCUS SPECTRUM SOLUTIONS LLC**

**I. SUMMARY**

Marcus Spectrum Solutions LLC (“MSS”) applauds the goal of the Commission in this proceeding “to inspire researchers to dream, discover and deliver the innovations that push the boundaries of the broadband ecosystem”.<sup>1</sup> However, the present Part 5 Experimental License System is **not** a major obstacle to innovation and given the expected tightening of resources at FCC due to the budget situation it is questionable

---

<sup>1</sup> Notice of Inquiry, ET Docket 10-236, at para. 1

whether the proposals here have really significant enough impact on innovation to justify the diversion of staff effort from larger impact issues such as the more general Wireless Innovation NOI.

The Commission's Spectrum Policy Task Force examined Part 5 and its 2002 report<sup>2</sup>, while never mentioned in the NOI, has promising ideas that might have a greater impact than those in the instant NOI. In particular, the nagging question of clarifying what is "harmful interference" would have a great impact on both experimental licensing **and** the more general question of stimulating wireless innovation.<sup>3</sup> In addition, the issue of NTIA coordination and NTIA transparency on actual federal spectrum use remains the "elephant in the room" in experimental licensing since the majority of spectrum is either federal government ("G") spectrum or shared G/NG spectrum subject to such coordination.

---

<sup>2</sup> Spectrum Policy Task Force, Report of the Unlicensed Devices and Experimental Licenses Working Group, November 15, 2002 (<http://www.fcc.gov/sptf/files/E&UWGFfinalReport.pdf>)  
The main SPTF report said the following on experimental licenses:

Only a few (commenting) parties addressed the topic of experimental licenses. The principal concern of these parties appeared to be potential delay involved in obtaining an experimental license due to interagency frequency coordination and, in particular, difficulties associated with testing systems being developed for government transfer bands and for overseas markets with different allocation plans. Concerns were also raised about the non-interactive nature of the coordination process from the point of view of private entities seeking to experiment with new technologies.

Report of the Spectrum Policy Task Force, Nov. 2002, at p. 60

([http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/DOC-228542A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-228542A1.pdf))

<sup>3</sup> Notice of Inquiry, GN Docket 09-157 ([http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/FCC-09-66A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-09-66A1.pdf)) para. 5 states:

"At times, we have seen innovators subjected to lengthy regulatory processes - such as debates over what constitutes harmful interference or how to fit a new spectrum use within our framework of rules - that can be an obstacle to progress in the wireless arena."

Many practitioners who deal with experimental licenses would probably state that improvements to the present OET Experimental Licensing System Electronic Filing<sup>4</sup> would probably offer the largest “bang per buck” of any action that FCC can take in this area. The present system dates from the 1995-era initial online filing system during the Hundt chairmanship. It focuses on implementing FCC Forms 405, 442, and 159 which were in use then but no longer exist in physical form. While it was a reasonable implementation for a quick switch to electronic filing in the 1990s, it is hopelessly outdated and confusing today and almost impossible to use for an applicant who does not deal with it on a regular basis.

Coordination requirements for Part 5 license are sometimes very burdensome and at times without substantive benefit for anyone. A rule change that would allow a showing of *de minimis* interference risk as an alternative to coordination would be very helpful in special cases where coordination is very burdensome and the technical nature of the experiment results in no real interference risk.

While not mentioned in the NPRM, the term of the license can be an issue for equipment developers. Prototypes of new models and upgrades to existing models may not be legally tested without a Part 5 license outside of a shielded facility. The present term provisions of §5.71(a), unchanged in the NPRM, provide vague criteria for 5 year licenses. We suggest that the final rules make clear that manufacturers with equipment authorization grants may receive 5 year grants for testing upgrades to models with such grants and for replacement models that also meet existing FCC service rules. Long

---

<sup>4</sup> <https://apps.fcc.gov/els>

development programs for model improvement and new models are a natural part of the equipment developing cycle and should not be subject to vague criteria for 5 year licenses in the case of equipment meeting present rules.

## II. INTRODUCTION

Marcus Spectrum Solutions (“MSS”), LLC, is the consulting practice of Michael J. Marcus, Sc.D., F-IEEE. Dr. Marcus is a retired FCC senior executive who was responsible for several key spectrum policy changes to stimulate innovation including the Docket 81-413 rulemaking that he proposed and directed resulting in the rules for Wi-Fi, Bluetooth, and ZigBee.<sup>5</sup> He was recognized by the Institute of Electrical and Electronics Engineers as a Fellow<sup>6</sup> in 2004 for "For leadership in the development of spectrum management policies". He is also an adjunct professor in the Department of Electrical and Computer Engineering at Virginia Tech where he is teaching a course on “Advanced Topics in Communications: Spectrum Policy and Wireless Innovation”<sup>7</sup>.

MSS has been an active participant in recent spectrum policy rulemakings filing both *pro se* and on behalf of clients. While filing Part 5 licenses is not an advertised MSS service, MSS has filed numerous Part 5 applications on behalf of clients and has hands on experience with the present system. The points presented in these comments result from both that hands on experience and his role on the Commission’s Spectrum Policy Task Force as chair of its Unlicensed Devices and Experimental Licenses Working Group (“UEWG”).

---

<sup>5</sup> <http://www.marcus-spectrum.com/page4/SSHist.html>

<sup>6</sup> [http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/DOC-243463A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-243463A1.pdf)

<sup>7</sup> <http://www.ece.vt.edu/news/articles/ece6604marcus.html>

While the online filing systems for Part 5 licenses are awkward and dated, in general the Part 5 system works very well and is not a major impediment to innovation. When the Spectrum Policy Task Force specifically asked for comments on the experimental licensing system and possible improvements in Docket 02-135, it received **virtually no input** – at that time it was clear that Part 5 licenses were not a major problem area. We believe that the general conclusion of the UEWG in 2002 is equally valid today.

Given limited Commission resources that are likely to get even more limited as the FY 2011 and subsequent year budgets unfold, it is important to use Commission resources not just on issues that have *some* marginal benefit – as most of the proposals in the NPRM do – but on issues that are the highest priority and offer the greatest public benefit in return for the FCC resources needed to complete such a rulemaking. The thrust of these comments is to identify such issues and urge the Commission to focus its scarce technical rulemaking resources on the most important issues, being realistic about the maximum bottom line benefits possible from this type of rulemaking.

The goals stated in para. 1 of the *Notice* are admirable:

We propose to leverage the power of experimental radio licensing to accelerate the rate at which these ideas transform from prototypes to consumer devices and services. Our goal is to inspire researchers to dream, discover and deliver the innovations that push the boundaries of the broadband ecosystem.

But it is unrealistic to believe that there is any outcome of this rulemaking that will have a significant impact in these areas since the current rules, though “creaky”, work reasonably well. However the issues addressed in the *Wireless Innovation NOI* about clarifying harmful interference and encouraging capital formation by resolving new wireless technology rulemakings on a more timely and predictable basis will have more

impact on these goals than all the proposals in this rulemaking even if they were adopted. We urge the Commission to prioritize those issues and recognize the lower priority of the issues in the instant NPRM.<sup>8</sup>

However any real improvement to the online OET Experimental Licensing System Electronic Filing System would be greatly appreciated by all those involved in Part 5 licensing and would have innovation benefits without any rulemaking action.

These comments will now review several areas for possible improvements to Part 5.

### **III. OET EXPERIMENTAL LICENSING SYSTEM ELECTRONIC FILING SYSTEM**

Anyone who has used this system knows that it is a relic of the FCC's rush to implement online filing on a minimal budget circa 1995 and is a real irritation to use. It is an implementation of FCC forms that no longer physically exist. Oddly, the proposed new §5.59 recodifies the same exact forms while requiring online filing.

If the Commission wants to “reinvent” Part 5, then it should eliminate this virtual forms and focus on the efficient way to ask applicants for the information that is needed. At present there are three different types of technical inputs needed: sites, frequencies, and emissions. The present system assumes these are independent so if you are using the

---

<sup>8</sup> We note that any movement in clarifying harmful interference will also help the Part 5 area since harmful interference is a key issue in such experiments.

same emissions on multiple frequencies you must enter the same information in again and again. Often one gets to a point where you think you have entered all the required information and there is no clear way to file what you have entered. One has to back track to find a screen where submittals are allowed.

All these present features are reasonable in terms of a 1995 implementation of paper forms – they are not reasonable today. It is time to throw away this software relic and start from scratch without basing it on archaic forms.

Perhaps some of this burden is a result of NTIA input requirements for coordination. Since NTIA presumably has the same goals of stimulating wireless innovation, the Commission should ask NTIA to consider a “zero based budgeting” approach on what information is really needed for routine coordination and work together to create a simple usable interface for applicants to replace the present online system.

#### **IV. THE “ELEPHANT IN THE ROOM” - NTIA**

NTIA is only mentioned 5 times in passing in the NPRM, but is really the “elephant in the room” in the case of experimental licensing due to their administration of the President’s 47 U.S.C. 305 authority per 47 U.S.C 902(b)(2)(A). How much spectrum is subject to NTIA coordination per the FCC/NTIA January 31, 2003 Memorandum of Understanding<sup>9</sup> is difficult to quantify precisely because it depend upon what bands are considered and the abstraction of adding numerical bandwidths if they are in different

---

<sup>9</sup> [http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/DOC-230835A2.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-230835A2.pdf)

octaves. But in 2002, FCC OPP Working Paper 38 examined the spectrum between 300 and 3000 MHz and concluded that 34% was “NG” licensed spectrum subject to FCC’s exclusive control but that 35% was shared “G/NG” spectrum requiring mutual coordination and 22% was “G” spectrum subject to NTIA coordination.<sup>10</sup> Thus 57% of this prime spectrum required NTIA coordination for all FCC licensing including experimental licensing. NTIA is a key player in experimental licensing!

The NTIA role includes both coordination of requests from applicants through FCC-NTIA coordination and the need for applicants to discover what frequencies are actually available for potential use without interference to Government users since applicants are required to propose specific frequencies. While the FCC’s licensing database is openly available and the NPRM helpfully points out the little publicized General Menu Reports system (GenMen)<sup>11</sup>, the comparable NTIA Government Master File (GMF) is not available for public inspection and much of it is classified.

Thus, a key issue in facilitating experimentation and coordination is improving access not to where Government transmitters are, rather to where they aren’t!

Attachment I contains the text of the Spectrum Policy Task Force’s Unlicensed Devices and Experimental Licenses Working Group report that dealt with experimental license

---

<sup>10</sup> At that time 6% of the spectrum in question was in unlicensed band and 3% was in transfer bands in transition from G to NG status. OPP Working Paper #38, U.S. Spectrum Allocations 300 - 3000 MHz: A Vertical Bar Chart With Frequency Bands Shown Approximately To Scale ([http://www.fcc.gov/Bureaus/OPP/working\\_papers/oppwp38chart.pdf](http://www.fcc.gov/Bureaus/OPP/working_papers/oppwp38chart.pdf))

<sup>11</sup> Notice at para. 25



issues in 2002.

The following section describes a *real* NTIA coordination problem:

Nortel staff revealed difficulty in obtaining experimental licenses for two systems that were being developed in their U.S. laboratory for overseas sales and whose operating frequency was in a band used by the Federal Government in the U.S. Nortel indicated that in both cases it was unable to meet with the NTIA's managers who had concerns and try to develop a modification to their application to limit power, frequency range, operating hours, operating location, or other parameters in order to conduct the proposed test without interference to Federal Government systems.

Motorola indicated similar concerns stating that in some instances, experimental licenses are necessary to develop and test equipment in the U.S. that is destined for export sales. According to Motorola, this requires short-term use of spectrum allocated for Government services and therefore under the control of the NTIA. Motorola asserts that the NTIA, under the auspices of the Department of Commerce, should welcome such use of the spectrum on a coordinated basis, especially when the outcome is sales of product into foreign countries, which helps the balance of trade. Motorola further states that it has at times experienced delays of 12 months or more in obtaining NTIA approval and delays longer than a few months can be the difference between successfully deploying product into a foreign marketplace or being denied critical sales.

Motorola has also suggested parallel review by FCC of potential interference of experiments to Federal Government systems, a procedure for allowing applicants to discuss with NTIA directly any concerns about applications and to negotiate possible modifications to eliminate interference threat to Federal systems.

MSS has experience with unresponsive NTIA coordination also, but due to client confidentiality can not give full details in this pleading, although the OET staff is aware of the case. On behalf of a client MSS applied for a Part 87 developmental license – very similar to experimental licenses as the NPRM points out – in a shared G/NG band for a use that was consistent with the allocation and using equipment that met the same ICAO standard as the FAA equipment in the band. MSS received back from the Commission a message that the application was rejected due to a lack of required NTIA coordination. An FCC staffer then sent the following message: “I’ve received final confirmation from FAA HQ. They will **not** support the frequency assignment for issuing an FCC license. I have no choice but to dismiss the pending application.”

It appears in this case that NTIA referred the application to the IRAC Aeronautical Assignments Group where an FAA representative “black balled” the application without the need to justify the rejection. Then NTIA forwarded the news to FCC without questioning it and FCC forwarded to MSS for the applicant, again without questioning the technical questions involved.

Apparently the FAA concern was similar to the issues raised by Nortel in its Spectrum Policy Task Force comments mentioned earlier. Sometime IRAC members view coordination as a way to express concerns about creating precedents and possibly annoyances with FCC rather than limiting issues to concerns of potential interference as provided for in the FCC/NTIA MOU.

While we understand that some deference to NTIA is appropriate in coordination, some oversight/ “adult supervision”<sup>12</sup> is also appropriate. Since the application was in a shared band and there was no real question of interference to *any* Government system, acknowledged in e-mail from FAA staffers, it would have been appropriate for FCC on its own motion to ask FAA and NTIA what was happening. This is similar to the above Motorola comment in the SPTF report – some oversight of NTIA coordination is needed and coordination failures should be questioned from time to time as appropriate.

The SPTF report also has the following suggestion for improving experimental licensing:

---

<sup>12</sup> “Adult supervision” is used here in the Silicon Valley context.

The UEWG believes that it would be beneficial to be able to identify certain frequency bands, locations and times where and when experiments generally may be conducted. With regard to Federal Government spectrum, the UEWG believes that one potential approach to this problem deals with the several bands now in transition from Federal Government use to non-Federal Government use. Non-government long term commercial operations cannot be licensed and operated in such bands until the transitions are completed and government systems are re-located. However, *all* such bands are not in use *everywhere* in the country *at all times*. There are likely opportunities for experiments in these bands on a non-interfering basis today if only one could determine the appropriate locations, frequencies, and times. The classification of NTIA assignments makes this difficult, if not nearly impossible, for private sector entities.

While it would be impractical, and probably a classification problem in itself, for NTIA to identify all location, frequency, and time combinations within the transfer bands that are practical for radio technology experiments, it would be possible with a modest amount of effort to identify a few areas of the country, preferably urban areas, where specific transfer bands are not presently in use and are not expected to be used prior to the final transfer to FCC control. NTIA could identify a small number of frequency and location pairs that it could announce and FCC could indicate that experimental license requests for those bands would not be delayed for lengthy NTIA coordination purposes, as they had initial pre-approval.

This is an example of asking NTIA to reveal where bands **aren't** used, information that often is not classified, although it might be embarrassing. This concept should be included in the Innovation Zone proposal in the NPRM.

## V. “HARMFUL INTERFERENCE”

The NPRM states

While we do not believe that it is necessary to impose overly prescriptive methods to control the potential for interference from experiments conducted under the broad authority of a research program experimental radio license, we emphasize that all experiments must be conducted on a non-interference basis to primary and secondary licensees, and that the licensee must take all necessary technical and operational steps to avoid harmful interference to authorized services.<sup>13</sup>

Thus harmful interference is a key issue in approving applications and in what licensees can do. In the Wireless Innovation NOI, the Commission commented on the difficulty of

---

<sup>13</sup> Notice at para. 25

determining “harmful interference”:

“The viability of spectrum access for new radio services often centers on whether the new service may cause harmful interference to incumbent services. This can lead to delays through protracted rule making proceedings that can create uncertainty and discourage investment.”<sup>14</sup>

Thus any clarification of what is harmful interference or speedier way to individual determination will add certainty to experimentation and encourage innovation. Indeed, we believe that progress in this area is so important that it dwarfs the net impact of the other proposals in the NPRM. In its letter to FCC Chairman Genachowski and NTIA Administrator Strickling, IEEE-USA, the policy arm of the electrical engineering professional society stated “Harmful interference will be a key issue using spectrum to stimulate economic growth.”<sup>15</sup>

## **VI. COORDINATION REQUIREMENTS**

Current FCC practice is to put coordination requirements on Part 5 licenses for all cochannel licensees. In some cases this can be overly burdensome, particularly if there are numerous licensees to coordinate with and the nature of the specific experiment is such that the risk of interference is *de minimis* due to the powers involved and the geometry.<sup>16</sup>

For example, MSS filed an application for a client 2 years ago for a ultrawideband-like

---

<sup>14</sup> *Wireless Innovation NOI* at para. 35

<sup>15</sup> Letter from IEEE-USA to FCC Chairman Genachowski and NTIA Administrator Strickling, May 6, 2010 (<http://www.ieeeusa.org/policy/policy/2010/050610.pdf>)

<sup>16</sup> However, coordination in broadcast bands is very simple due to the efficient Society of Broadcast Engineers coordination process. ([http://www.sbe.org/sections/freq\\_local.php](http://www.sbe.org/sections/freq_local.php))

system for a military contractor's experiment.<sup>17</sup> This experiment involved 100 mW erp emission spread evenly over 553 MHz. The license that was granted had a coordination requirement for 2 different classes of licensees which was accomplished with great difficulty. In view of the low power spectral density involved in the experiment and its location on the middle of a university campus in a courtyard the real interference risk was *de minimis*. But in this case it was easier to coordinate than ask for a special exception. But the lesson learned from this is that the FCC should codify an option to permit a special technical showing of *de minimis* interference risk as an alternative to coordination. No one benefits from coordination requests for special situations with extremely low interference risk. Coordination may be beneficial in many cases, but this is a case where it was not.

---

<sup>17</sup> File 0459-EX-ST-2009, Call sign WE9XBT. The application clearly stated that use of the frequency requested was for a one time experiment to verify a signal processing concept and that the applicant and the sponsor had no intention of using the requested spectrum beyond a short term experiment.

## VII. CONCLUSIONS

While the proposals in this Notice would all have some small positive benefit, it is unlikely they will have a significant impact on wireless innovation unless they are coupled with more significant reform, particularly in areas dealing with clarifying what is “harmful interference” and in NTIA transparency and coordination issues.

A total overhaul of the dated and obsolescent OET Experimental Licensing System Electronic Filing System would be very helpful and *would* lower barriers to experimentation.

/S/

Michael J. Marcus, Sc.D., F-IEEE  
Director  
Marcus Spectrum Solutions, LLC  
8026 Cypress Grove Lane  
Cabin John, MD 20818

mjmarcus@marcus-spectrum.com

cc: Julius Knapp  
Doug Sicker

